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10/758,609	01/15/2004	Richard T. Walter	0275L-000675	6146
27572	7590	11/16/2005	EXAMINER	
HARNES, DICKEY & PIERCE, P.L.C.			CUEVAS, PEDRO J	
P.O. BOX 828			ART UNIT	
BLOOMFIELD HILLS, MI 48303			PAPER NUMBER	
			2834	

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/758,609

Applicant(s)

WALTER ET AL.

Examiner

Pedro J. Cuevas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-54, 66-79, 90-105, 107-110, 112, 114-117, 119 and 121 is/are pending in the application.
- 4a) Of the above claim(s) 55-65, 80-89, 106, 111, 113, 118 and 120 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) \*  is/are rejected. - all claims not withdrawn are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/21/04.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of claims 1-54, 66-79, 90-105, 107-110, 112, 114-117, 119, and 121 in the reply filed on August 31, 2005 is acknowledged. The traversal is on the ground(s) that "both groups of claims as filed could be examined together without serious burden ...". This is not found persuasive because the generator's system nominal output voltage limitation found in independent claim 55 of Group II is not found in any of the claims of Group I.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 55-65, 80-89, 106, 111, 113, 118, and 120 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on August 31, 2005.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 24-25, and 66 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,117,390 A to Iwata et al.

Iwata et al. clearly teaches the construction of a double-voltage, automotive type alternator having at least first and second modes, the generator system producing a first alternating current output voltage when in the first mode and producing the first alternating

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current output voltage and a second alternating current output voltage when in the second mode, the second output voltage being twice the first output voltage, comprising:

first (3) and second (4) voltage sources each having an output at which they produce the first output voltage;

a single pole switch (15) coupling the first and second outputs of the first and second voltage sources in parallel when the switch is in a first position and in series when the switch is in a second position, the first output voltage produced at the outputs of the first and second voltage sources when the switch is in the first position and the second output voltage produced across the series coupled outputs of the first and second voltage sources when the switch is in the second position with the first output voltage also produced at the outputs of the first and second voltage sources when the switch is in the second position; and

a controller (10) coupled to the first and second voltage sources, the controller operating the first and second voltage sources so that their first output voltages are in phase when the switch is in the first position and one-hundred and eighty degrees out of phase when the switch is in the second position;

wherein the current available at the first output voltage when the outputs of first and second voltage source are coupled in parallel is greater than the current available at the first output voltage when the outputs of the first and second voltage sources are coupled in series;

wherein the outputs of the first and second voltage sources each have live and neutral outputs, the single pole switch being one single pole relay with the single pole of

the single pole relay coupled across the live output of the first voltage source and the live output of the second voltage source.

5. With regards to claim 66, Iwata et al. discloses a method of controlling a generator system having at least first and second modes where the generator system produces a first alternating current output voltage when it is in the first mode and produces the first output voltage and a second alternating current output voltage when it is in the second mode, the second output voltage twice the first output voltage, comprising:

coupling the outputs of the first and second voltage sources in parallel and operating the first and second voltage sources so that the voltages at the outputs of the first and second voltage sources are in phase when the generator system is in the first mode; and

coupling the outputs of the first and second voltage sources in series and operating the first and second voltage sources so that the voltages at the outputs of the first and second voltage sources are one-hundred and eighty degrees out of phase when the generator system is in the second mode with the second output voltage produced across the series coupled outputs of the first and second voltage sources and the first output voltage produced at each of the outputs of the first and second voltage sources.

6. Claim 34 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,665,158 B2 to Walker.

Walker clearly teaches the construction of an alternator/inverter with dual H-bridge and automatic voltage regulation having at least first and second modes, the generator system producing a first alternating current output voltage when in the first mode and producing the first

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alternating current output voltage and a second alternating current output voltage when in the second mode, the second output voltage being twice the first output voltage, comprising:

first (64, 66) and second (68) voltage sources each having an output at which they produce the first output voltage; and

a single pole switch (70) coupling the first and second outputs of the first and second voltage sources in parallel when the switch is in a first position and in series when the switch is in a second position, the first output voltage produced at the outputs of the first and second voltage sources when the switch is in the first position and the second output voltage produced across the series coupled outputs of the first and second voltage sources when the switch is in the second position with the first output voltage also produced at the outputs of the first and second voltage sources when the switch is in the second position,

wherein the first output voltage is nominally 120 VAC and the second output voltage is nominally 240 VAC.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,117,390 A to Iwata et al. in view of U.S. Patent No. 5,097,165 A to Mashino et al.

Iwata et al. disclose the construction of a double-voltage, automotive type alternator as disclosed above, wherein a single generator having first and second sets of windings provides the generators of the first and second voltage sources, the first set of windings coupled to the AC power converter of the first voltage source to provide the generator of the first voltage source and the second set of windings coupled to the AC power converter of the second voltage source to provide the generator of the second voltage source.

However, it fails to disclose first and second voltage sources that each include a generator coupled to an AC power converter having an output that provides the output of that first and second voltage source.

Mashino et al. teach the construction of a dual generator system with floating higher voltage output comprising:

first and second voltage sources each include a generator coupled to an AC power converter having an output that provides the output of that first and second voltage source;

for the purpose of independently producing a second voltage being higher than the first voltage.

It would have been obvious to one skilled in the art at the time the invention was made to use the a dual generator system with floating higher voltage output disclosed by Mashino et al. on the double-voltage, automotive type alternator disclosed by Iwata et al. for the purpose of independently producing a second voltage being higher than the first voltage.

9. With regards to claim 4, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a controller which includes a first controller for controlling the first voltage source and a second controller for controlling the second voltage

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source, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

10. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,117,390 A to Iwata et al. in view of U.S. Patent No. 5,097,165 A to Mashino et al. as applied to claims 4-6 above, and further in view of U.S. Patent No. 5,159,539 A to Koyama.

Iwata et al. in view of Mashino et al. disclose the construction of a double-voltage, automotive type alternator as disclosed above.

However, it fails to disclose the AC power converters of the first and second voltage sources include cycloconverters.

Koyama teach the construction of a high frequency DC/AC power converting apparatus comprising:

- a cycloconverter (15) included on the AC power converters of the voltage source (12);

- a controller (20) coupled to the cycloconverter of the voltage source, the controller operating the cycloconverters of the voltage source using cosine control (Figures 6, 10, and 16), so that it is in phase when the switch is in the first position and one-hundred and eighty degrees out of phase when the switch is in the second position; for the purpose of performing PWM operation.

It would have been obvious to one skilled in the art at the time the invention was made to use the cycloconverter and controller disclosed by Koyama on the double-voltage, automotive type alternator disclosed by Iwata et al. in view of Mashino et al. for the purpose of performing PWM operation.



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11. Claims 10-18, 26-33, 35-54, 67-79, 90-105, 107-110, 112, 114-117, 119, and 121 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,117,390 A to Iwata et al. in view of U.S. Patent No. 5,097,165 A to Mashino et al. further in view of U.S. Patent No. 5,159,539 A to Koyama as applied to claims 7-9 above, and further in view of U.S. Patent No. 5,512,811 A to Latos et al.

Iwata et al. in view of Mashino et al. further in view of Koyama disclose the construction of a double-voltage, automotive type alternator as disclosed above, wherein:

the controller operates the positive and negative banks of naturally commutated switching devices of each cycloconverter in a non-circulating mode, the controller enabling one of the positive and negative banks and disabling the other of the positive and negative banks of each cycloconverter based on the instantaneous output current of that cycloconverter; and

the controller disables the positive bank of each of the cycloconverters when the instantaneous output current of that cycloconverter transitions from positive to negative, and then enables the negative bank of that cycloconverter only after a true zero current condition at the output of that cycloconverter occurs, the controller further disabling the negative bank of each of the cycloconverters when the instantaneous output current of that cycloconverter transitions from negative to positive and then enables the negative bank of that cycloconverter only after a true zero current condition at the output of that cycloconverter occurs;

for each cycloconverter the true zero current condition at the output of that cycloconverter is determined by a comparator determining that actual output current of that cycloconverter is between first and second reference levels;

a band-pass filter (4) for each cycloconverter for filtering the instantaneous output current of that cycloconverter to reduce current ripple and ensure that a signal output by the band-pass filter at a fundamental frequency of 60 Hz does not have any phase-shift relative to the instantaneous output current of that cycloconverter, the signal output by the band-pass filter coupled to an input of a comparator that generates a signal indicative of whether the instantaneous output current transitioned from positive to negative or from negative to positive; and

the controller simulates back EMF voltage waveforms of the generator using the rotor position signal and develops the control waves from the back EMF voltage waveforms.

However, it fails to disclose at least one rotor position sensor that senses the position of a rotor of the generator and generates a signal indicative of the position of the rotor.

Latos et al. teach the construction of a starter/generator system having multivoltage generation capability comprising:

a rotor position sensor (52) that senses the position of a rotor of the generator and generates a signal indicative of the position of the rotor that are displaced one-hundred and twenty degrees from each other;

a controller (Figure 2) that uses the rotor position signal to develop control waves which it uses to control the converter (22);

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for the purpose of ensuring phase lock of the variable frequency three-phase AC excitation produced by the bidirectional AC-DC power converter with the permanent magnet synchronous machine during the start mode.

It would have been obvious to one skilled in the art at the time the invention was made to use the rotor position sensor and controller disclosed by Latos et al. on the double-voltage, automotive type alternator disclosed by Iwata et al. in view of Mashino et al. further in view of Koyama for the purpose of ensuring phase lock of the variable frequency three-phase AC excitation produced by the bidirectional AC-DC power converter with the permanent magnet synchronous machine during the start mode.

12. With regards to claim 14-16, Koyama discloses each cycloconverter includes a positive and a negative bank of naturally commutated silicon controlled rectifiers and the controller generates a reference wave and controls the cycloconverters by generating firing signals for the naturally commutated switching devices based on comparisons of the control waves to the reference wave.

13. With regards to claim 17, Koyama discloses the claimed invention except for a silicon controlled rectifier/opto-silicon controlled rectifier combination. It would have been an obvious matter of design choice to use a silicon controlled rectifier/opto-silicon controlled rectifier combination since the applicant has not disclosed that said combination solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with a silicon controlled rectifier.

14. With regards to claim 19-23, Mashino et al. discloses an engine, and Latos et al. discloses a brushless DC motor drive circuit coupled to at least one set of the generator windings for

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driving the generator as a brushless DC motor to start the engine, the rotor position sensor, which includes a hall effect transducer, and is coupled to a brushless DC motor controller of the brushless DC motor drive circuit.

15. With regards to claims 29 and 74, it would have been obvious to one having ordinary skill in the art at the time the invention was made to set the first and second reference levels between +100mA and -100mA, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

#### ***Conclusion***

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pedro J. Cuevas whose telephone number is (571) 272-2021. The examiner can normally be reached on M-F from 8:30 - 6:00.

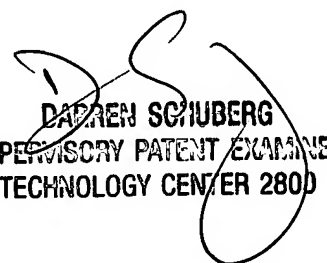
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (571) 272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Pedro J. Cuevas  
November 11, 2005



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